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CLAIMS

1. A method of controlling an electronic cam type rotary cutter which is driven by a servo motor, and which is controlled in long and short cutting operations by different speed waveforms on the basis of an electronic cam curve, wherein

a position loop is formed in a whole region on the basis of an electronic cam curve, an electronic cam curve of a cubic function is used as a position pattern for a noncutting zone, and an electronic cam curve of a quadratic function is used as a speed pattern, whereby a control is enabled with causing a same algorithm to automatically cope with the long and short cutting operations and a change of a line speed.

2. A method of controlling an electronic cam type rotary cutter which is controlled in long and short cutting operations by different speed waveforms on the basis of an electronic cam curve, and in which a line speed is controlled to be reduced in the short cutting operation, wherein

a position loop is formed in a whole region on the basis of an electronic cam curve, an electronic cam curve of a cubic function is used as a position pattern for a noncutting zone, and an electronic cam curve of a quadratic function is used as a speed pattern, whereby necessity of reduction of the line speed is eliminated even in a length range which is shorter than a range of a conventional art, and a cutting operation is enabled while maintaining the line speed to 100%.

3. A method of controlling an electronic cam type rotary cutter according to claim 1 or 2, wherein a speed pattern of a spiral blade due to a cam curve diagram is, in a cutting zone, identical with the line speed, and, in the

noncutting zone, a quadratic curve which is raised in the short cutting operation, and a quadratic curve which is reduced in the long cutting operation, and a speed pattern of a straight blade is a pattern which is different from the spiral blade in that only the speed in the cutting zone is proportional to $1/\cos\theta$.

4. A method of producing an electronic cam curve wherein, after a sealing work, a cutting work, or the like is performed in synchronization with a workpiece in a specific phase zone of one cycle of a rotary mechanism such as a lateral sealing mechanism of a vertical continuous packaging machine which is driven by a servo motor, or a rotary cutter which cuts a workpiece into a constant length, a cubic function is used in a position command according to a continuous correlation control system including a prediction to a start of a work in a next cycle, and a quadratic function is used in a speed feedforward, whereby an optimum electronic cam curve is obtained while allowing a bag length or a cut length of the workpiece to automatically perform correspondence irrespective of a value of peripheral length/M (M = 1, 2, ..., the number of sealing faces or blades).

5. A method of producing an electronic cam curve according to claim 4, wherein a rotational speed n_2 and a rotational position y_2 of the lateral sealing mechanism or the cutting blade in the sealing zone or the cutting zone are

$$n_2 = N_1 \qquad \text{(rpm)}$$

$$y_2 = (1/M - Y_1)/(Tc - t_3) \times (t - Tc) + 1/M \qquad \text{(rev)}$$

where N_1 is the line speed at a start point, Y_1 is a rotational position of a cutting start point, t_3 is a time of the cutting start point, and Tc is one cycle time,

a curve equation of the nonsealing zone or the noncutting zone is a cubic function having four coefficients satisfying four boundary conditions of velocities V_1 and V_2 and positions X_1 and X_2 at times T_1 and T_2, a position x and a speed v which is obtained by differentiating the position x are indicated by

$$x = At^3 + Bt^2 + Ct + D \qquad \text{(rev)}$$

$$v = 3At^2 + 2Bt + C \qquad \text{(rps)},$$

(T_1, X_1) and (T_2, X_2) are substituted into equation x, (T_1, V_1) and (T_2, V_2) are substituted into equation v, the equations are solved for A, B, C, and D, $T_1 = 0$, $T_2 = t_3$, $X_1 = 0$, $X_2 = Y_1$, $V_1 = N_1/60$, and $V_2 = N_1/60$ are substituted to obtain A, B, C, and D, and

cam curve equations at a rotational speed = n_1 and a rotational position = y_1 in the nonsealing zone or the noncutting zone, and the rotational speed n_2 and the rotational position y_2 in the sealing zone or the cutting zone are obtained as

$$n_1 = 60(3At^2 + 2Bt + C) \qquad \text{(rpm)}$$

$$n_2 = N_1 \quad \text{(constant)} \qquad \text{(rpm)}$$

$$y_1 = At^3 + Bt^2 + Ct + D \qquad \text{(rev)}$$

$$y_2 = (1/M - Y_1)/(Tc - t_3) \times (t - Tc) + 1/M \qquad \text{(rev)}.$$